

ABSTRACT

An underfill material for attaching and underfilling a
5 semiconductor component on a substrate includes a polymer
base material, and electrically conductive particles in the
polymer base material. The particles are configured to melt
and rigidify bonded electrical connections between solder
terminal contacts on the component and substrate contacts on
10 the substrate. A size and concentration of the particles is
selected to prevent electrical conductivity in X and Y
directions. A method for attaching and underfilling the
component on the substrate includes the steps of depositing
the underfill material on the substrate or the component,
15 placing the terminal contacts in contact with the substrate
contacts while the underfill material is in a viscous or B-
stage condition, bonding the terminal contacts to the
substrate contacts to form the connections, and then curing
the underfill material to form an underfill layer. During
20 the bonding step at least some of the conductive particles
melt and form solder layers on the substrate contacts.